



## COURSE OUTLINE

### 1. Information about the program

1.1 Higher education institution	“Alexandru Ioan Cuza” University of Iași
1.2 Faculty	Faculty of Economics and Business Administration
1.3 Departament	Department of Accounting, Information Systems and Statistics
1.4 Field of study	Business Informatics
1.5 Cycle of study	Master
1.6 Study program / Qualification	Software Development and Business Information Systems

### 2. Information about the course

2.1 Course title	Database Logic in Business Applications						
2.2 Course coordinator	Lect. Ionut Hrubaru, Ph.D.						
2.3 Seminar coordinator	Lect. Ionut Hrubaru, Ph.D.						
2.4 Year of study	I	2.5 Semester	I	2.6 Type of evaluation*	P	2.7 Course status**	C

\* MT-MID-TERM, O-ORAL EXAM, E-EXAM, M-MIXED; \*\* C-compulsory/O-optional/E-elective

### 3. Estimated time allocation (hours per semester and teaching activities)

3.1 Number of hours per week	4	out of which: 3.2 course	2	3.3 seminar / laboratory	2
3.4 Total number of hours per semester	56	out of which: 3.5 course	28	3.6 seminar / laboratory	28
Time allocation					h
Study based on course book, course materials, bibliography and other					30
Supplementary study in the library, on electronic platforms and on the field					14
Preparing seminars/laboratories, assignments, papers, portfolios and essays					30
Tutorship					14
Examination					6
Other activities .....					
3.7 Total hours of individual study					94
3.8 Total hours per semester					150
3.9 Number of credits					6

### 4. Prerequisites (if applicable)

4.1 Referring to curriculum	Databases (or similar)
4.2 Referring to competences	Not applicable

### 5. Conditions (if applicable)

5.1 For the course	<ul style="list-style-type: none"><li>Lecture rooms shall be provided with video projector</li><li>Students will attend lectures. Cell phones must be turned off</li></ul>
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**5.2** For the seminar / laboratory

- IT services of the faculty will provide a real or virtual machine to act as Oracle Database Server
- Students are invited to bring and use their own laptops; Oracle Database Server could be installed on each laptop, but also can connect to the faculty Oracle Server, so the minimum requirement is a Oracle DB client (SQL Developer)
- Labs will have enough computers for students not owning a laptop
- Lab computers will have installed an Oracle client (SQL Developer) and network infrastructure in order to connect to the Oracle DB Server

**6. Specific competences accumulated**

<b>Professional competencies</b>	<ul style="list-style-type: none"><li>• C1.5 Development of analysis, design, implementation and testing of an information system based on real-world case studies and compare various solutions (0.5 credits)</li><li>• C2.1 Mastering theoretical and technological knowledge and tools concerning business data modeling, query, processing, administration and analysis, including Big Data (0.5 credits)</li><li>• C2.2 Selection and refinement of the methods and techniques for data modeling, persistence, query and analysis, according to the nature of problems and available resources (0.5 credits)</li><li>• C2.3 Assess the degree of information integrity and validity for organizational data; find the appropriate tools for administration and analysis of business data (0.5 credits)</li><li>• C2.4 Design the most appropriate solutions for gathering, storage, processing, administration and analysis of business data according to the organizational resources and constraints (0.5 credits)</li><li>• C2.5 Develop projects and case-studies concerning modeling, implementation (database logic), administration and analysis of data for real-world applications (1.5 credits)</li><li>• C4.5 Write the specifications and deploy the modules regarding data, applications and services integration (1.5 credits)</li></ul>
<b>Transversal competencies</b>	<ul style="list-style-type: none"><li>• CT1 – The ability to communicate and collaborate in teams of different professionals (0.5 credits)</li></ul>

**7. Course objectives** (based on specific competencies accumulated)

<b>7.1 General objective</b>	<ul style="list-style-type: none"><li>• To provide the core knowledge, methodologies and tools in order to deal with modeling and managing of high volumes of business data</li></ul>
<b>7.2 Specific objectives</b>	<ul style="list-style-type: none"><li>• Knowledge of database logic in business applications</li><li>• Knowledge of and skills for programming in Oracle PL/SQL</li><li>• Ability to design database schema</li><li>• Ability to develop and deploy database logic modules</li><li>• Knowledge and skills for implementing business rules in database layer</li><li>• Deeper knowledge of static and dynamic SQL</li></ul>

**8. Content**

<b>8.1</b>	<b>Course</b>	<b>Teaching methods</b>	<b>Observations</b> (time and bibliography)
1.	Introduction to database logic in business application. SQL review.	PPT presentation, discussion, script execution	2 hours [Fotache 2019] [Plew & Stephens 2003] [Fotache et al. 2003] [Fotache 2009] [w3schools 2017]
2.	Oracle SQL. OLAP and pivot options	PPT presentation, code execution, discussion. Case studies	2 ore [Fotache, 2019] [Fotache, 2009]



3.	Basic PL/SQL <ul style="list-style-type: none"><li>• blocks, alternative structures, loops</li><li>• procedures, functions, packages</li><li>• cursors and exceptions</li></ul>	PPT presentation, script execution, discussion	2 hours [Feuerstein & Pribyl 2014] [Fotache et al. 2003] [Fotache 2009] [Fotache 2019]
4.	PL/SQL and persistent collections in Oracle	PPT presentation, code execution, discussion. Case studies	2 hours [Feuerstein & Pribyl 2014] [Fotache et al. 2003] [Fotache 2019] [Fotache 2009]
5.	Database design for real applications. E-R diagrams (Oracle Data Modeler). Database schema temporal validity. Normalization vs. performance	PPT presentation, E-R diagrams, discussion. Case studies	2 hours [Fotache, 2005] [Ponniah, 2007] [Blaha, 2010] [Fotache, 2019]
6.	Patterns in data modeling and their implementation in Oracle PL/SQL	PPT presentation, diagrams discussion. Case studies	4 hours [Blaha 2010] [Fotache 2019] [Ponniah 2007]
7.	Triggers. Implementation in Oracle PL/SQL	PPT presentation, code execution, discussion. Case studies	6 hours [Feuerstein & Pribyl 2014] [Fotache et al. 2003] [Fotache 2005] [Fotache 2009] [Fotache 2019]
8.	Implementing Business Rules in Oracle PL/SQL	PPT presentation, code execution, discussion. Case studies	3 hours [Feuerstein & Pribyl 2014] [Fotache et al. 2003] [Fotache 2005] [Fotache 2009] [Fotache 2019]
9.	Scheduling in PL/SQL (DBMS_SCHEDULER). Case study	PPT presentation, code execution, discussion. Case study	1 hour [Fotache 2019]
10.	Dynamic SQL	PPT presentation, code execution, discussion. Case study	4 hours [Fotache et al. 2003] [Fotache 2009] [Feuerstein & Pribyl 2014] [Fotache 2019]
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**Bibliography****References:**

Blaha, M. – Patterns of Data Modeling, CRC Press, Boca Raton CA, 2010  
Feuerstein, S., Pribyl, B. - Oracle PL/SQL Programming, Sixth Edition, O'Reilly, 2014  
Fotache, M., Strîmbei, C., Crețu, L., Oracle 9i2. Ghidul dezvoltării aplicațiilor profesionale, Ed. Polirom, Iași, 2003  
Fotache, M., Proiectarea bazelor de date. Normalizare și postnormalizare. Implementări SQL și Oracle, Ed. Polirom, Iași, 2005  
Fotache, M., SQL. Dialecte DB2, Oracle, PostgreSQL și SQL Server, Ed. Polirom, Iași, 2009  
Fotache, M. (2019). Database Logic in Business Applications, UAIC, FEAA, Iași, (available on the FEAA portal and GitHub - <https://github.com/marinfotache/Database-Logic-in-Business-Applications>)  
Hay, D. (2006). - Data Model Patterns: A Metadata Map, Morgan Kaufmann, San Francisco, CA  
Oracle Analytic SQL for Developers - <https://devgym.oracle.com/pls/apex/dg/class/analytic-sql-for-developers.html>  
Plew, R. and Stephens, R. - Sams Teach Yourself SQL in 24 Hours, Sams Publishing, 2003, freely available at [http://www.informit.com/library/library.aspx?b=STY\\_Sql\\_24hours](http://www.informit.com/library/library.aspx?b=STY_Sql_24hours)  
Ponniiah, P. – Data Modeling Fundamentals, Wiley Interscience, Hoboken, NJ, 2007  
TutorialsPoint.com - PL/SQL Tutorial, freely available at [http://www.tutorialspoint.com/plsql/plsql\\_tutorial.pdf](http://www.tutorialspoint.com/plsql/plsql_tutorial.pdf)

**Compulsory reading:****Optional reading:**

8.2	Seminar / Laboratory	Teaching methods	Observations (time and bibliography)
1.	Installing and configuring (on personal laptops) Oracle Database Server and Oracle SQL Developer. SQL scripts for database creation and population.	Scripts and code execution	2 hours
2.	Oracle SQL. Requirements and solutions for a sample of TA1 (Team Assessment) – SQL.	Discussion. SQL solutions writing and analysis	2 hours
3.	TA1 - team assessment no 1. SQL	Presentation of the team solution	2 hours
4.	Problems and solutions in PL/SQL (1)	Scripts and code execution	4 hours
5.	TA2 - team assessment no 2. PL/SQL basics	Presentation of the team solution	2 hours
6.	Oracle Data Modeler. Create database diagrams with ODM	Demonstration, diagrams discussion	2 hours
7.	P1v1 - Presentation of the 1st part of the project - a real world case database schema designed with Oracle Data Modeler	Applications requirements and diagram discussion, feedback, assessment	2 hours
8.	P1v2 – Refined P1v1 schema (after the P1v1 feedback and suggestions)	Applications requirements and diagram discussion, feedback, assessment	2 hours
9.	Triggers in PL/SQL. Examples. Case studies	Discussion, Scripts and code execution	4 hours
10.	TA3 - team assessment no 3. PL/SQL triggers	Presentation of the team solution	2 hours
11.	Business Rules in PL/SQL	Demonstration, scripts and code execution. Discussion	2 hours



12.	Presentation of second part of the proiect - database logic implemented in Oracle PL/SQL	Discussion, Scripts and code execution	2 hours
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**Bibliography**

Fotache, M., Proiectarea bazelor de date. Normalizare și postnormalizare. Implementări SQL și Oracle, Ed. Polirom, Iași, 2005

Fotache, M., SQL. Dialecte DB2, Oracle, PostgreSQL și SQL Server, Ed. Polirom, Iași, 2009 Fotache, M., Strîmbei, C., Crețu, L., Oracle 9i2. Ghidul dezvoltării aplicațiilor profesionale, Ed. Polirom, Iași, 2003

Oracle Corp. - Oracle SQL, PL/SQL, Application Development and other documentation, available at [www.oracle.com](http://www.oracle.com)

Oracle Analytic SQL for Developers - <https://devgym.oracle.com/pls/apex/dg/class/analytic-sql-for-developers.html>

W3schools – SQL Tutorial, 2015, <http://www.w3schools.com/sql/default.asp>

**Compulsory reading:****Optional reading:****9. Bridging course content with the expectations of the community, professional associations and representative employers in the field of the program**

- The content of this discipline has been decided upon by taking into account both the curricula of some prestigious Western Universities and the demands of the economic environment provided by potential employers, either in the public or in the private IT companies

**10. Evaluation**

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Allocation to the final grade (%)
<b>10.4 Course</b>			
Individual test. Database Modeling (design a database schema for some given requirements using data model patterns and seed models)	Solution validity	Written test	15%
<b>10.5 Seminar/Laboratory</b>			
Team assessment no 1. SQL	Data validity and relevance. SQL queries syntax validity	SQL Scripts	15%
Team assessment no 2. PL/SQL Basics	Validity and finesse of the solution	PL/SQL modules	15%
1st part of the project -	Validity, relevance and	Presentation and	17.5%



database schema in Oracle Data Modeler for a real world case)	complexity of proposed database schem	discussion of the application requirements and E-R diagram with each team member	
Team assessment no 3. PL/SQL Triggers	Validity and finesse of the solution	PI/SQL modules	15%
The second part of the proiect - database logic implemented in Oracle PL/SQL	Validity, relevance, complexity and finess of the solution	Presentation and discussion of the PL/SQL modules with each team member	22.5%
<b>10.6 Minimal performance standard</b>			
<ul style="list-style-type: none"><li>Design and implement diagrams, scripts and code modules for database logic</li></ul>			

Date

Course coordinator

Seminar coordinator

25.09.2021

Lect. Ionut Hrubaru. Ph.D.

Lect. Ionut Hrubaru, Ph.D.

Date of approval in the departament

Head of Departament